CAUTI reduction at Mayo Clinic

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Objectives

• Review the basic principles of CAUTI prevention
• Discuss the methods used to reduce unnecessary catheter use hospital-wide
• Present the methods, process improvement and outcomes from implementing the Mayo CAUTI bundle
CAUTI by the numbers

- 25% of hospital pts have a urinary catheter
- CAUTI is the most common type of healthcare-associated infection
  - > 30% of HAIs reported to NHSN
- 13,000 attributable deaths in 2002
- Excess length of stay: 2-4 days
- Increased cost: $0.4-0.5 billion per year nationally
- Unnecessary antimicrobial use
Why does CAUTI matter to hospitals?

- CAUTI is publicly reported and available to the public on the Hospital Compare web site
  - High CAUTI rates are bad for the hospital’s reputation
- CAUTI is part of Pay for Performance programs
  - Value based Purchasing (VBP)
  - Healthcare Associated Conditions (HAC) program
What is a CAUTI?

1. Patient had an indwelling urinary catheter for > 2 days AND catheter was still present on the date of event OR removed the day before the date of event
2. Patient has at least one of the following signs or symptoms:
   • fever (>38.0°C)
   • suprapubic tenderness
   • costovertebral angle pain or tenderness
   • urinary urgency, urinary frequency, dysuria (only in pts whose catheter has been removed in the last 24 hours)
3. Patient has a urine culture with no more than two organisms, at least one of which is ≥100,000 CFU/ml (excludes yeast)

Fever + positive urine culture + Foley catheter > 2 days = CAUTI

CAUTI metric is non-specific

• CAUTI surveillance definition is simplistic, designed to make comparisons between institutions easier
• Bacteria in urine culture in a hospitalized patient with fever with an indwelling catheter > 48 after admission
  • Still CAUTI if another cause for fever is documented
  • Still CAUTI if fever resolves without treatment
• Poor metric for many reasons:
  • Most patients with a Foley develop bacteruria (3-7% per day)
  • Many elderly have chronic bacteruria (25-50% women in long term care)

Unfortunately this is the definition used to measure and compare CAUTI across the nation. We must reduce CAUTI measured in this manner or put hospital’s reputation/CMS reimbursement at risk
Basic Principles of CAUTI prevention

Indication required when ordering a catheter

• Management of acute urinary retention and urinary obstruction
• Perioperative use for selected surgical procedures
• Accurate measurement of urine output in critically ill patients
• Assistance in wound healing for incontinent patients
• Required immobilization for trauma or surgery
• End-of-Life care

Daily needs assessment

• Documentation of need assessment a required row in nursing flow sheet
Urinary Catheter Utilization

Device Utilization ratio = Number of Catheter days
Number of Patient days

Catheter insertion at Mayo

- Dedicated catheter team at Mayo since 1907
- Urology technicians trained in catheter insertion and catheter care
- Available 24/7
- Male and female catheter teams
- Annual competency assessments
- Place all catheters in the hospital and emergency room
Despite this CAUTI rates were still high.....

<table>
<thead>
<tr>
<th>Year</th>
<th>Catheter days</th>
<th>Number of Infections</th>
<th>Number expected</th>
<th>SIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>21630</td>
<td>60</td>
<td>54.65</td>
<td>1.098</td>
</tr>
<tr>
<td>2014</td>
<td>22438</td>
<td>56</td>
<td>56.12</td>
<td>0.998</td>
</tr>
</tbody>
</table>

**VBP thresholds**

2016 0.850  
2017 0.845  
2018 0.906  
2019 0.464

**Multidisciplinary CAUTI reduction group**

- Project start: May 2014
  - Infection Prevention and Control
  - Floor nurses
  - Catheter team staff
  - Clinical nurse specialist
  - Hospitalist
  - Health systems engineer/Quality improvement specialist
Initial steps

• Review guidelines
• Process maps
• Interviews with staff from the positive outliers (units with very low CAUTI rates) to learn from CAUTI prevention practices on their units
• Surveys of frontline nursing staff
• Audits of processes
Process map

Top identified areas for improvement
- Alternatives (e.g. IG, condom catheter) are considered
- Catheter secured and remains secured
- Sterile, closed system maintained
- Bladder scanning for post-op voiding difficulty
- Catheters removed when appropriate
- Chlorhexidine bathing performed

CAUTI Prevention and Reduction Checklist
Nursing Survey

1. Are you aware of what your unit’s CAUTI rates are?
2. Is a daily needs assessment done for each patient with an indwelling urinary catheter?
3. Is the daily needs assessment documented in the medical record?
4. Are urinary catheters removed promptly when appropriate indications for use are no longer met?
5. Are alternatives to indwelling urinary catheterization considered (e.g. external condom catheters, intermittent catheterization, bladder scanning)?
6. Is bladder scanning used prior to indwilling urinary catheter placement in post-op patients with difficulty voiding?
7. Is the urethral catheter maintenance nursing guideline reviewed periodically by staff?
8. Is chlorhexidine used for bathing patients?
9. Does the genital area get cleaned during routine bathing?
10. Is hand hygiene done before catheter maintenance (e.g. site care, opening closed system)?
11. Is a sterile, continuously closed drainage system maintained (i.e., never disconnected or otherwise opened)?
12. How often is a regular catheter bag changed to a Ciprofloxacin container?
13. Is the catheter secured (and remains secured)?
14. Is an unobstructed urine flow maintained (e.g., tubing not kinked)?
15. Is the drainage bag kept below the level of the bladder?
16. Do you have a set schedule on which you empty collection bags?
17. What is your practice for frequency of emptying?
18. Is the bag emptied into separate clean container?
19. Is the collection bag emptied before going to a procedure or test?
20. When needed for a test, is urine aspirated from a port, the port cleansed with alcohol, and drawn using a sterile syringe/latex adapter?
21. Please identify other barriers to CAUTI prevention - what could we, as nurses, do better?
22. Please identify barriers to documenting catheter maintenance
23. What interventions and initiatives has your unit tried or are currently trying to decrease CAUTI?
Rounding / observations

• Observed: 181 catheters

- Top areas for improvement were
  - Securement
  - Bathing / peri-care / catheter care

Please identify other barriers to CAUTI prevention - what could we, as nurses do better?
Results in Pilot unit (Medical ICU)
<table>
<thead>
<tr>
<th>Objectives</th>
<th>Strategies</th>
<th>Strategy of choice</th>
<th>How to make it happen</th>
<th>CAUTI BUNDLE messages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing/Unit education</td>
<td>ICU education/issue</td>
<td>TBD</td>
<td>TBD</td>
<td>CONSIDER alternatives</td>
</tr>
<tr>
<td>Alternatives</td>
<td>Improve knowledge and use of alternatives</td>
<td>Alternatives available during ordering</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>ICU – Nycole Hansen</td>
<td>Work on mobilization / ICU</td>
<td>ICU A has made sure the available product</td>
<td>CONSIDER with a securement device</td>
<td></td>
</tr>
<tr>
<td>Increase use of bed pans / urinals</td>
<td>Include alternatives in Nursing education</td>
<td>ICU A has made sure the available product</td>
<td>CONSIDER with a securement device</td>
<td></td>
</tr>
<tr>
<td>Nursing/Unit education</td>
<td>ICU educational tour</td>
<td>ICU A has made sure the available product</td>
<td>CONSIDER with a securement device</td>
<td></td>
</tr>
<tr>
<td>ICU – Nycole Hansen</td>
<td>Unit A will lead</td>
<td>Unit A has made sure the available product</td>
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**Objectives**

- Nursing/Unit education
- ICU education/issue

**Strategies**

- Alternatives
- ICU education/issue
- ICU – Nycole Hansen
- Work on mobilization / ICU
- Increase use of bed pans / urinals
- Include alternatives in Nursing education
- Nursing/Unit education
- ICU educational tour
- ICU – Nycole Hansen
- Unit A will lead

**Strategy of choice**

- Alternatives available during ordering
- Work on mobilization / ICU
- Increase use of bed pans / urinals
- Include alternatives in Nursing education
- ICU educational tour
- ICU – Nycole Hansen
- Unit A will lead

**How to make it happen**

- Alternatives available during ordering
- Work on mobilization / ICU
- Increase use of bed pans / urinals
- Include alternatives in Nursing education
- ICU educational tour
- ICU – Nycole Hansen
- Unit A will lead

**CAUTI BUNDLE messages**

- CONSIDER with a securement device
- Keep it CLEAN
- Keep it CLOSED
- CALL for bladder scan before irrigating
- CULTURE urine only when indication is clear

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**Based on the 2014 Compendium guidelines**

17 pages of recommendations were boiled down to the 6 C’s of highest priority for Mayo Clinic

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**Prevent CAUTI**

**Catheter-Associated Urinary Tract Infections**

- CONSIDER alternatives
- CONNECT with a securement device
- Keep it CLEAN
- Keep it CLOSED
- CALL for bladder scan before irrigating
- CULTURE urine only when indication is clear
Alternative Indications

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bladder ultrasound</td>
<td>Post-op or other retention; avoid catheterization if no significant urine present</td>
</tr>
<tr>
<td>Urinals</td>
<td>To measure I&amp;Os in an awake, cooperative male patient</td>
</tr>
<tr>
<td>Bed pans, incontinence pads</td>
<td>If I&amp;O is not crucial and patient is regularly tended to</td>
</tr>
<tr>
<td>Intermittent catheterization</td>
<td>Chronic neurogenic bladder: spinal cord injury/disorder, other neurologic diseases; prostate enlargement; and post-operative urinary retention</td>
</tr>
<tr>
<td>External catheters</td>
<td>Condom catheters: Cooperative male patients with other catheter indications but no obstruction or urinary retention</td>
</tr>
</tbody>
</table>

**CONSIDER alternatives**
Avoid indwelling (Foley) catheters when possible.
- Alternatives: voiding trial, bladder scan, I&O catheterization, urinal, bedpan, and condom catheter

- Remove the catheter when no longer medically necessary.
- Perform a daily catheter need assessment to determine if the catheter can be removed or an alternative used.

**CONNEC**t with a se**curement device**
Secure EVERY urinary catheter.
Securing prevents inadvertent pulling of the catheter that can irritate the urinary tract and introduce bacteria.

- Choose the appropriate securement device for your population (p.g. long-term, short-term, post-operative catheter), stock on unit, and train staff to use properly.

<table>
<thead>
<tr>
<th>Connect with securement devices</th>
</tr>
</thead>
<tbody>
<tr>
<td>- STATLOCK® 3-way: ROMIC#277965</td>
</tr>
<tr>
<td>- STATLOCK® 2-way: ROMIC#259913</td>
</tr>
<tr>
<td>- Pediatric STATLOCK®: ROMIC#294552</td>
</tr>
<tr>
<td>- FLEXI-TRAK®: ROMIC#214512</td>
</tr>
<tr>
<td>- Leg band: ROMIC#105890</td>
</tr>
</tbody>
</table>

For more information about connecting with a securement device, see the INSITE article.
Keep it **CLEAN**

Use incontinence clean up cloths or soap and water to clean the perineum, urethral meatus and urinary catheter.

Perform peri-care and catheter care with daily bath and after fecal incontinence.

Always clean the perineum front to back.

Document the cleaning.

Do not use chlorhexidine for peri-care and catheter care.

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Keep it **CLOSED**

Breaking the closed urinary system increases the risk for contamination; do so only when medically necessary.

Do hand hygiene, use clean gloves and aseptic technique when exchanging a drainage bag for another container.

Clean the tapered end of the collection container tubing and the catheter with alcohol prior to connecting.
Urine culture practices influence on CAUTI

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Prevalence of bacteruria</th>
<th>Prevalence of fever</th>
<th>% of urine cultures</th>
<th>Number of CAUTIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scenario 1</td>
<td>30%</td>
<td>20%</td>
<td>30%</td>
<td>18</td>
</tr>
<tr>
<td>Scenario 2</td>
<td>30%</td>
<td>20%</td>
<td>60%</td>
<td>36</td>
</tr>
<tr>
<td>Scenario 3</td>
<td>30%</td>
<td>20%</td>
<td>10%</td>
<td>6</td>
</tr>
</tbody>
</table>
105 CAUTIs in 2012-13, fever was the primary indication for obtaining culture (97%).
51% had an alternative infection to explain the fever: pneumonia, BSI
18% had fever due to noninfectious cause
32% had no alternative explanation. Of these, 66% received appropriate empiric antimicrobial therapy, but no targeted therapy changes were made based on urine culture results.
The other 34% did not receive antimicrobial therapy at all.
Only 6% of all CAUTIs resulted in blood cultures positive for the same organism within 2 days. The urinary tract was not definitely established as the source of bloodstream infection.
Urine culture was not useful in evaluation of the febrile hospitalized, catheterized patient.

Provider role:
- Order urine culture only if one of the criteria above met
- Do not order urine cultures for:
  - Pyuria or smelly/cloudy urine
  - Positive gram stain
  - For routine screening purposes
Reduction in Urine cultures

Urine Culture Orders for Hospitalized Patients with Urinary Catheter

Urine cultures ordered/number of admissions

% admissions with Urine Cultured >48 hours after admission
Countermeasure: Secondary bloodstream infections

<table>
<thead>
<tr>
<th># of infections</th>
<th>Pt days</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>22</td>
<td>308,572</td>
</tr>
<tr>
<td>Intra</td>
<td>8</td>
<td>170,927</td>
</tr>
<tr>
<td>Post</td>
<td>6</td>
<td>163,661</td>
</tr>
<tr>
<td>Re-measure, 2016Q1-Q2</td>
<td>4</td>
<td>157,821</td>
</tr>
</tbody>
</table>

**Secondary Bloodstream Infections (2014Q1-2015Q4)**

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**Choosing Wisely**

Five Things Providers and Patients Should Question

Don't perform urinalysis, urine culture, blood culture or *C. difficile* testing unless patients have signs or symptoms of infection. Tests can be falsely positive leading to overdiagnosis and overtreatment.

Although important for diagnosing disease when used in patients with appropriate signs or symptoms, these tests often are positive when an infection is not present. For example, in the absence of signs or symptoms, a positive blood culture may represent contamination, a positive urine culture could represent asymptomatic bacteruria, and a positive test for *C. difficile* could reflect colonization. There are no perfect tests for these or most infections. If these tests are used in patients with low likelihood of infection, they will result in more false positive tests than true positive results, which will lead to treating patients without infection and exposing them to risks of antibiotics without benefits of treating an infection.
CALL for bladder scans before irrigating

Irrigation increases CAUTI risk as it compromises the sterility of the closed system. Accurate assessment of bladder urine volume eliminates unnecessary irrigations. If bladder scan shows no urine in the bladder, irrigations are not appropriate. If irrigation is appropriate, it should be performed only by trained personnel.

Providers:
Do not order irrigation if bladder scan does not show urine in the bladder
Do not ask nurses to irrigate Foley – this should be done by Urology techs
Media campaign

- Posters
- Pocket cards
- Culture cards
- Nursing tip sheet
- Video featuring “Uti”
- CAUTI checklist for audit
- Education modules for nurses and providers
- Patient Care Assistant education
- Nursing and provider FAQ
- Articles in nursing and provider newsletters
Material distributed to Nursing Units

<table>
<thead>
<tr>
<th>Year</th>
<th>Urinary catheter days</th>
<th>Observed infections</th>
<th>Expected infections</th>
<th>SIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>21630</td>
<td>60</td>
<td>54.65</td>
<td>1.098</td>
</tr>
<tr>
<td>2014</td>
<td>22438</td>
<td>56</td>
<td>56.12</td>
<td>0.998</td>
</tr>
<tr>
<td>2015</td>
<td>41966*</td>
<td>24</td>
<td>92.53</td>
<td>0.259</td>
</tr>
</tbody>
</table>

* 2015 includes ICU + non ICU
Positive feedback

• Articles and newsletters
• Bagels and thank you’s
• Recognition in meetings and presentations

Dear MICU:

The most amazing thing happened when a group of people rallied around an issue and decided to do something about it.

You went a whole year with ZERO CAUTI!!!

I can’t say enough about the work that you did to make this happen and the commitment you showed to patient safety. In Infection Prevention and Control, we are proud to be a support service but we know it is you that take care of the patients and you are the ones who can prevent infection. And you did, in a huge way.

You have done an incredible job.

On behalf of IPAC and the CAUTI reduction team, thank you.

Sincerely,
Jean Westlake, RN Director of Infection Prevention and Control

CAUTI by the numbers
Lessons learned

- Be clear about goals
- Involve front line staff
- Education is important, needs to be targeted, point of use education works best
- Constant reinforcement, feedback needed
Resources

• SHEA/IDSA Practice Recommendations to Prevent CAUTIs in Acute Care Hospitals, 2014
• HICPAC CAUTI Guideline, 2009
• AHRQ Toolkit for reducing CAUTIs in hospitals
• CDC CAUTI Toolkit